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perfect cylinder alone, not to its parts. It is evident the strength would decrease in a rapid ratio, as the segment of the cylinder was less; what that ratio would be, would take too much time to investigate now, but it is evident at once, that half a hollow cylinder, would have much less than half the strength of a whole one; and that a quarter would be still less strong, in proportion; and that the lesser segments would become still weaker and weaker, as the arch of which they consisted was flatter, or approached nearer to a plane plate. In the masts of men of war a very obvious saving may be made in reducing the length of the part which runs down into the hold; there can be no benefit in having them to descend below the orlop deck, at farthest; and strong uprights beneath them from thence to the kelson, would be fully adequate to support the weight above, which is the only purpose for which the part of the mast that goes below the orlop deck serves, and this it effects at an enormous expense.

As to making the whole hull of iron, which is the last plan proposed, it is no new idea, but it certainly deserves more attention than it has hitherto met. Many barges made of cast iron, and of wrought iron plates, we are informed by good authority, are now plying on the canals and rivers in different parts of England, where they are found to answer very well; but to form a ship of iron would require a combination of parts, and an internal framing very different from that of barges, and much thought and calculation would be necessary to devise these, of any adequate perfection. The chief difficulty in the execution would be in rolling plates of sufficient length to serve as planks, but plans for this purpose might no doubt be devised by the same ingenious artists, who have already overcame so many difficulties in the iron manufacture, and brought it to a state of perfection, perhaps superior to that of any other art. The chief benefit of iron ships, would be in their value as old iron, when too old for farther service, and it is probable that for those of a very large size, for which timber of adequate scantling is so extremely expensive, iron would be found considerably cheaper in the first instance, and would besides have the advantage of leaving no waste, as every particle of it not used, would be of value.

Method of preparing from bean stalks, a substitute for Hemp; by the Rev. James Hall. Walthamstow.

Rep. of Arts, v.16, p.219.

Mr. Hall has ascertained that every bean plant contains from 20 to 35 filaments running up on the outside under a thin membrane, from the root to the top; those at the four corners being rather thicker and stronger than the rest. Next to Chinese grass (used for connecting hooks to fishing lines) the fibres of the bean plant are among the strongest discovered. These with a little beating, rubbing, and shaking are easily separated from the strawy part, when the plant has been steeped 8 or 10 days in water, or when it is damp, and in a state approaching to fermentation, or what is commonly called rotting. Washing, and then pulling it through hackles, or iron combs, first coarse, and then finer, is necessary to the dressing of bean hemp; and appears to Mr. Hall, the easiest way of separating the filaments from the thin membrane which surrounds them.

From carefully observing the number of bean plants in a square yard, in various situations; and from weighing the hemp or filaments of a certain number of them, Mr. Hall calculates that every acre, of bean stalks produces about 2 cwt. of hemp.

He computes that there are 200,000 acres of beans planted annually in Great Britain and Ireland, which at the present rate of hemp, from 60 to £120 per ton, must produce a large profit to the proprietors, if it were collected from the beans, exclusive of the great national advantage of having a supply of hemp at home, when foreign markets for it are cut off, and the benefit it would afford in giving employment to the poor.

Mr. Hall exposed a parcel of the hemp nearly 12 months, to all the varieties of the air within doors, and kept another parcel as long constantly under water, without either of them being in the least injured. The chief difference between them was, that the one kept constantly under water, had assumed a rich silky gloss, and a much more agreeable colour than it had before.

If bean straw be kept for years under water, or quite dry, it produces hemp as good and fresh as at first. But if it be sometimes wet, and sometimes dry the fibres are apt to be injured.

If the bean straw be exposed to the vicissitudes of the weather, spread thin on the ground, for two or three months, the hemp is easily separated from the strawy part, without any other process than merely beating, rubbing and shaking them: but then the fibres are more or less injured, though not so much as to prevent their being excellent materials for making paper.

When bean straw is to be steeped for the hemp, the beans are to be thrashed in a mill, and then to prevent the fibres from being injured, the beans should be put to the mill, not at right-angles, but parallel to the rollers, or nearly so, otherwise the straw is apt to be much cut, particularly if it is very dry.

The bean straw contains a saccharine juice, and is highly nutritive, perhaps more so than any other, and like clover, the prunings of the vine, the loppings of the fig tree, &c. yields a rich infusion, which produces uncommonly fine table beer, as well as an excellent spirit by distillation. It is the hemp or fibres which prevents cattle from eating it. These, like hairs in human food, make cattle dislike it. Mr. Hall, at the end of his paper, takes into consideration other materials, which may be applied to the manufacture of paper, as well as that which he before proposed.—He states that about the generality of mills for beating and dressing hemp and flax, a large proportion, in some inland parts of Great Britain and Ireland amounting nearly to one half of what is carried thither, is either left to rot, under the name of refuse, or thrown away as of no use, because too rough and short for being spun, and converted into cloth, even of the coarsest kind. This, on being beat and shaken, so as to separate the strawy part, becomes as soft and pliable as the longest, and is as fit for making paper. In its natural state this refuse is of a brown colour, but by the application of the bleaching acids, and lixiviums now universally known, it can in a few hours be made perfectly white.

To show the demand for paper, Mr. Hall gives the following curious calculation of the quantity of paper consumed annually in London, in newspapers. There are at a medium published in London, every morning 16000 newspapers, and every evening about 14000. The Sundays newspapers amount to about 25,000, and there are nearly 20,000 other weekly papers, making in all 245,000 per week. At a medium, twenty newspapers weigh one pound, hence the whole amounts to about three tons per week, or 260 tons per annum. But though this perhaps is not one half of the paper expended in London on periodical publications, and what may be called fugacious literature, and not one fourth part of what is consumed in other ways in printing houses, in the country at large, yet there are materials enough in the refuse of the hemp and flax raised in Britain and Ireland for all this.

Another plentiful supply of materials for paper may be had from the bine or straw of hops, which contains an excellent hemp fit for making many articles. And if even one half of the bine of hops, raised in Kent, Sussex, and Worcester, instead of being thrown away, or burnt, as is commonly done, was steeped in water for ten or twelve days, and beat in the same manner, as is done with hemp and flax (independent of what might be got from bean stalks, and a variety of other articles) there would be found materials enough annually, for three times the quantity of paper used in the British dominions.

Letters are added to this paper in testimony of the excellence of the samples of bean hemp, sent to the society of arts, &c. by Mr. Hall, of their being the produce of bean stalks, and of the advantages which might be derived by the nation from encouraging the collection of hemp of this nature, and of its utility in the arts; of these letters the most remarkable are from Messrs. Houne and Alford, shoemakers, on the great strength of bean hemp, tried by them in sewing leather, and of the decided preference which they gave it to other hemp; and a letter from Mr. Davy to certify that he has tried the chemical agents in whitening bean hemp; that it bears bleaching very well, and that as to chemical properties, it differs very little from common hemp.

Mr. Davy also observes very properly, that the question, whether bean hemp is likely to be of useful application, is a mechanical one, and must be solved by experiments on its comparative strength.

The silver medal of the society for the encouragement of arts, &c. was given to Mr. Hall for this communication.

Remarks....We think till the mechanical experiments are made upon bean hemp, which Mr. Davy mentions, it would be premature to decide on its superiority to other kinds of hemp, and that Mr. Hall in doing so has not had sufficient foundation for his opinions. Nevertheless there can be little doubt, that it would answer nearly as well as other hemp for most purposes, and fully as well for making paper. The great impediment to its use will proceed from the expense of collecting it: only two hundred weight of it can be got from an acre of beans; which supposing that the straw amounts to but four tons per acre, will require forty times its weight of the bean straw, to be peeled and picked to produce it, besides other manual operations which it must undergo. Mr. Hall seems to be aware of the great proportion of labour it will require in its manipulation more than other hemp; but by a strange error of reasoning, he wishes to infer that this is rather a benefit, on account of the additional employment it will give to women and children, not considering that mere labour in itself can be no advantage, and that it is worse than useless if its produce does not pay for the maintenance of those employed during the time consumed in it.

But supposing that at the present high price of hemp bean hemp would pay for its collection, it is a question whether it would be right to turn the labour of the country into a channel that could not be permanent, and whether it is not better to increase the quantity of common hemp raised at home, in the manufacture of which no loss could be sustained by a waste of labour.

On the quantity of labour, required to finish a given weight of bean hemp, experiments should be made, as well as on the points mentioned by Mr. Davy, before any decision should be made as to the advantage of its introduction; we are however induced to conjecture that the vast proportion of bean straw to the hemp produced, will remain an objection to its use, nearly insuperable.

Description of a new Cupping Instrument invented by Robert Healy esq. M.B. of Dublin.

This instrument consists of two parts, one is a cupping glass, made in the usual way with a short connecting pipe at its top, tapped with a screw of a course thread, by which it may be connected with the other part; which is a vessel (for producing a vacuum) of tin, or thin sheet copper, containing about half a pint, with a stop cock soldered to it, made to screw to the pipe of the cupping glass, and of which about a quarter or half an inch should extend within the vessel, for a purpose that will be mentioned.

The instrument is to be used in the following manner. The hollow vessel is to be unscrewed from the cupping glass, and a little air is to be drawn from it by the mouth, and the cock is then to be instantly turned to prevent the external air from rushing in. Ether or spirit of wine is to be placed in a glass, and the mouth of the stop cock being inverted into it, the cock is to be turned, and about a